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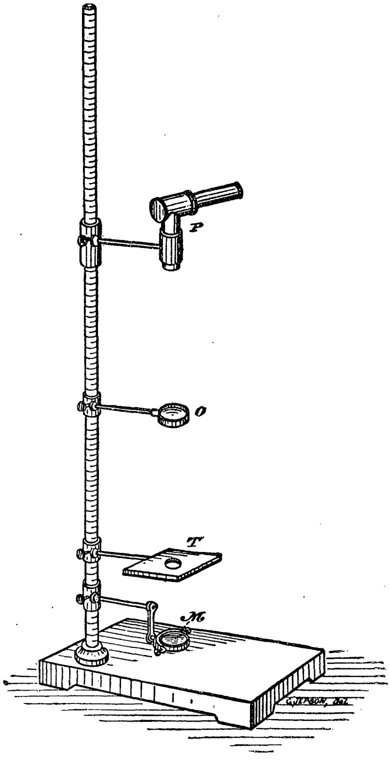
seven notes of our musical scales, he avoids many of our melodial sequences ; the majority of his tunes follow the *dur* or *sharp* scales and the two-eighth or two-fourth measure. The instruments accompanying Indian song are the flageolet, flute, panflute, whistle, and various kinds of tambourins, drums and kettledrums. See Baker, Theodor: Ueber die Musik der nordamerikanischen Wilden, Leipzig, Verlag von Breitkopf und Härtel (Haertel), 1882, 8vo, pp. 82, 2 plates, of which one is colored.—*Albert S. Gatschet.*

MICROSCOPY.[1]

DRAWING APPARATUS OF PROFESSOR HIS.—In part first of his "Anatomie menschlicher Embryonen," pp. 8–9, Professor His has described a drawing apparatus altogether similar to the one here represented.

For anatomical and embryological work, an apparatus of this kind is simply indispensable. As every working naturalist knows, an apparatus that admits the use of the *camera lucida* with a low magnifying power, varying from five to forty diameters, offers many advantages that are not to be obtained from any system of microscopical objectives. In the absence of such an instrument, one is compelled to draw by measurement and "by the eye," a process which at best is slow and tedious, and liable to many inaccuracies. The foundation of every thorough embryological work consists, as Professor His remarks, *of exact drawings of the entire embryos as well as the sections obtained from them.* Any one acquainted with the embryometrical investigations of Professor His on the chick, will hardly require to be told that such surface views as he employed for orientation in microtomic sections, could not be obtained without the aid of photography, or the camera lucida, or by both. The instrument here described offers the same facilities for obtaining



His' Drawing Apparatus.

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[1] Edited by Dr. C. O. WHITMAN, Newton Highlands, Mass.

the exact topographical relations of a complicated object with low magnifying powers that the microscope affords with higher powers. Further, only a single plano-convex lens 2.5^{cm} in diameter, is required for an enlargement varying at pleasure from five to fifty diameters. Professor His employs as an objective a stereoscope-head (of Dallmeyer), or a small Steinheil aplanat (No. 1).

The instrument consists of a heavy circular iron base,[1] from the center of which rises a brass rod, marked to centimeters, half centimeters, and millimeters. On this rod are seen the mirror (*M*), the object-table (*T*), the objective (*O*), and the camera lucida (*P*), all supported by horizontal bars that move on sliding ferrules, The mirror is placed as near the base as convenience will allow, and its supporting bar is 7.5^{cm} long. The bars bearing the other pieces are all of corresponding length, and the sliding ferrules can be fixed at any point by the aid of set-screws. The ferrules of the mirror and the object-table are made of such length that when in contact with each other and resting on the highest part of the base, they are in the position required for the lowest magnifying power. In this position the object-table has an elevation of 11^{cm}, the objective 18.5^{cm}, and the camera 22^{cm} above the lower face of the base, or what may be called the drawing plane.

Thus placed the focal distance is 7.5^{cm}, and the camera is considerably lower than it is possible to have it in ordinary microscopes. The magnifying power is 10 diam., but it may be reduced to 5 diam. by elevating the drawing plane. It is of course possible to obtain a lens that will magnify only 4 or 5 diam. in the normal position of the drawing plane, and endeavors will be made to provide the instrument with such a lens.

The magnifying power may be increased in several ways, but most conveniently by shortening the focal distance and raising the camera until it is properly adjusted. Starting with the parts placed as above given, in order to raise the magnifying power from 10 to 15 diam., the objective must be lowered 7^{mm} and the camera elevated 2^{cm} ; and for 20 diam., the objective must be lowered 10^{mm} and the camera elevated 3.5^{cm}. Keeping the object-table in its first or normal position, the magnifying power may be increased to 50 diam. by lowering the objective 2^{cm} and raising the camera 15^{cm}. The camera thus has an elevation of 37^{cm} above the normal drawing plane. The magnifying power may also be increased by lowering the drawing plane, or what is the same thing, by raising the object-table.

The positions which the objective and camera must have for a given magnifying power will probably vary slightly in two instruments made as nearly alike as possible, but their determination is a very simple matter; and having been once accurately ascertained, they may be tabulated and kept for subsequent use. To ascertain these positions for any given magnification, a millimeter scale may be placed on the object-table, and the camera and objective moved until the picture projected on the drawing plane has the desired enlargement. When the scale is replaced by the object, care must be taken to have the surface, which is to be outlined, in the plane previously occupied by the scale. To this end it may be necessary to move the object-table a very little, in order to give a sharply defined picture, the positions of the camera and objective being left unaltered.

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[1] This form has been found more convenient than the rectangular form seen in the figure.

The object-table measures 8 × 10^{cm}, and has a central perforation 2.5^{cm} in diam. The whole apparatus is completed by a movable shade, designed to cut off the light falling on the lens and on the drawing plane.

It is hardly necessary to remark that opaque objects require direct sunlight or light from a lamp supplied with a bull's eye condenser.

This instrument, including lens, and Oberhäuser's camera lucida, may be obtained from Geo. A. Smith & Co., 7 Park street, Boston, for thirty dollars. For everything except the camera, the price is fifteen dollars.

THE MICROBE OF "RED EVIL," A PIG DISEASE.—A disease of pigs, known in France as *rouget* or *mal rouge* (red evil), has of late, says the *English Mechanic*, wrought terrible ravages in the Rhone valley, 20,000 pigs having succumbed in a year. M. Pasteur has detected the microbe to which the disease is due. It is something like that of chicken cholera, but much smaller and different in physiological properties. Its form is that of the figure 8. It has no action on fowls, but rapidly kills rabbits and sheep. Injected in almost inappreciable quantity into pigs, it suffices to cause mortal disease. M. Pasteur has succeeded in producing an attenuated form of this virus, wherewith healthy pigs may be vaccinated and rendered refractory to the contagion.

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SCIENTIFIC NEWS.

— Dr. D. G. Brinton, of Philadelphia, is about to publish an important work entitled LIBRARY OF ABORIGINAL AMERICAN LITERATURE. The following are some of the works which it is proposed to issue in this series: No. 1. THE CHRONICLES OF THE MAYAS, edited by D. G. Brinton, M.D. This volume will contain five brief chronicles in the Maya language of Yucatan, written shortly after the conquest, and carrying the history of that people back many centuries. Four of these have never been published, nor even translated into any European tongue. Each will be given in the original, with a literal translation and grammatical and historical notes. To these will be added a history of the